REMARKS/ARGUMENTS

The claims are 1, 2 and 4-8 with claims 10-11 having been withdrawn from consideration by the Examiner as directed to a non-elected invention. Reconsideration is expressly requested.

Claims 1, 2 and 4-9 were rejected under 35 U.S.C. §103(a) as being obvious over the previously cited *Knight Photonic Crystal Fibers* article in view of *Galvanauskas et al. U.S. Patent No. 5,499,134* and *Tayebati et al.* alone (claims 1, 2, 7 and 8) or further in view of *Broeng et al. U.S. Patent Application Publication No. 2002/0131737* (claims 4-6) or *Svilans et al. U.S. Patent No. 6,915,030* (claim 9).

Essentially, the Examiner's position was that *Tayebati et al.* discloses a laser source, and a tunable compressor preceding a fiber, that *Knight* teaches that photonic crystals may be used to replace normal optical fiber in any situation where they are better than optical fiber, such as use in high power applications, that *Galvanauskas et al.* teaches a femtosecond laser producing a chirped beam, and that it would have been obvious to combine the femtosecond seeder of *Galvanauskas et al.* and *Tayebati* to make a higher power beam and to use a photonic

crystal fiber because the higher power might burn a fiber that did not have a hollow core. *Broeng et al.* was cited with respect to claims 4-6 as teaching a polarization maintaining microstructured photonic fiber with a diameter of less than 5 micrometers. *Svilans et al.* was cited with respect to claim 9 as teaching the use of an optical spectrum analyzer for use in monitoring networks of channels.

This rejection is respectfully traversed.

As set forth in claim 1, Applicants' invention provides a device for generating tunable light pulses including a pulse laser light source for producing femtosecond light pulses having an optical spectrum, and a temporal frequency progression ("chirp"), an adjustable optical optical compressor for changing the chirp of the light pulses output from the pulse laser light source, and a non-linear optical fiber for modifying the optical spectrum of the femtosecond light pulses and for tuning the generated light pulses coupled out of the non-linear optical fiber to the desired wave length in accordance with the chirp of the light pulses received from the optical compressor.

If high intensity light pulses are coupled into a non-linear optical fiber, the spectrum of the light pulses changes due to non-linear optical effects that occur in the fiber. Applicants have found that in the case of certain non-linear optical fibers which are described in detail in the patent application, the change in the optical spectrum depends on the time related frequency progression ("chirp") of the light pulses coupled into the fiber. In other words, as recited in claim 1, light pulses are produced by means of a corresponding laser light source, and the chirp of these light pulses is then changed by means of a adjustable optical compressor. These changed light pulses are coupled into the non-linear optical fiber, which results in light pulses whose spectrum is variable, specifically in accordance with the adjustment of the optical compressor.

None of the cited references discloses or suggests a device for generating tunable light pulses including an adjustable optical compressor for changing the chirp of the light pulses output from the pulse laser light source, and a non-linear optical fiber for tuning the generated light pulses coupled out of the non-linear optical fiber to the desired wavelength in accordance with the chirp of the light pulses received from the adjustable optical compressor.

The primary reference to *Knight* relates to microstructured photonic fibers and their properties. There is no disclosure or suggestion that the change in the optical spectrum of light pulses in such fibers is sensitively dependent on the chirp of the light pulses that are coupled in. Although column 2 at page 848 of *Knight* refers to high-power fiber lasers, nothing in *Knight* discloses or suggests use of the effect on the optical spectrum of light pulses from the chirp of the light pulses that are coupled in. Contrary to the Examiner's position, the production of a light beam with greater power is not the main concern of Applicants' device as recited in claim 1. Rather Applicants' invention is concerned with making available a device with which tunable light pulses can be produced. In fact, the patent application does not mention greater power at any point. Accordingly, it is respectfully submitted that there is nothing in the *Knight* article that discloses or suggests using a non-linear optical fiber for a device for producing tunable light pulses.

The defects and deficiencies of the primary reference to *Knight* are nowhere remedied by any of the secondary references.

Galvanauskas et al. relates to the amplification of ultra-short light pulses by means of a pumped optical fiber, with

previous stretching and subsequent recompression taking place. This technique is generally referred to as "chirped pulse amplification" or CPA for short. In *Galvanauskas et al.'s* system, Bragg gratings are used as optical compressors or stretchers, respectively; they are produced by means of structuring optical fibers. These compressors are not adjustable, which by itself is a significant difference from Applicants' device as recited in claim 1 as compared with *Galvanauskas et al.* Another difference is that *Galvanauskas et al.'s* device is intended for amplifying light pulses with the important thing being that the import light pulses and the output light pulses have the same wave length. Production of light pulses with a tunable optical spectrum, which is the object of Applicants' device as recited in claim 1, is therefore neither possible with *Galvanauskas et al.'s* system nor desired at all as well.

Tayebati et al. is even further afield. Although the Examiner has taken the position that *Tayebati et al.* discloses an adjustable optical compressor that precedes an optical fiber, it is respectfully submitted that the Examiner is incorrect. The prism arrangement described in *Tayebati et al.* serves to influence the direction of spread of a beam of light. In accordance with *Tayebati et al.*, a thermo-optical material is

used. The angle of refraction of the prism arrangement can therefore be influenced by means of a change in the temperature. Although dispersive optical elements such as prisms are also used in optical compressors, it is clear that the prism arrangement described in *Tayebati et al.* is not an optical compressor as recited in Applicants' claim 1. An optical compressor is obtained only by means of a suitably selected structure of the dispersive elements, so that it is ensured that the spatially separate path of the beams having different wavelengths has different optical path lengths, and the partial beams leave the structure, at the end, in perfectly superimposed manner. This prerequisite is not met by the prism arrangement described in *Tayebati et al.* Pairs of prisms (or also pairs of optical gratings that can be used), which are intended to be used as optical compressors, must be passed through two times, in opposite directions, because the individual spectral components of the light pulses are spatially separate from one another after having passed through the arrangement once, and leave the arrangement in spatially superimposed manner again only after having passed through it the second time. Because the light passes through the prism arrangement that is described in *Tayebati et al.* only once, this arrangement is clearly not a compressor as recited in Applicants' claim 1.

The remaining references cited by the Examiner *Broeng et al.* and *Svilans et al.* have been considered but are believed to be no more pertinent. As stated in Applicants' previous amendment filed April 24, 2006, *Broeng et al.,* like *Knight*, simply refers to specific micro-structured photonic fibers and their characteristics. Although such fibers may be used in Applicants' device, *Broeng et al.* like *Knight* fails to give any hint of using a non-linear optical fiber for a device for producing tunable light pulses, and there is no disclosure or suggestion of connecting an adjustable compressor in series to the fibers, according to the claim 1 in order to influence the temporal frequency progression of the input light pulses.

Similarly in *Svilans et al.,* there is no disclosure or suggestion of a device or method for generating tunable light pulses that uses an adjustable optical compressor and a non-linear optical fiber connected at the output side of the compressor. *Svilans et al.* simply discloses an optical spectrum analyzer for monitoring channel status or detecting location at a number of working channels from a wave-length division multiplexed (WDM) signal.

Accordingly, it is respectfully submitted that claim 1, together with claims 2 and 4-9, which depend directly or indirectly thereon, are patentable over the cited references.

In view of the foregoing, it is respectfully requested that the claims be allowed, and that this case be passed to issue.

Respectfully submitted,

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